

## 2013 Weather Year in Review!

The year 2013 will probably best be remembered as a seemingly brief summer stuck between two long and miserable winters. Some folks won't even remember that summer part, only the winters.

### Seasonal Summaries:

In retrospect, the past **winter** (2012/2013) did have a somewhat normal start, with temperatures and precipitation for the December 2012 through February 2013 portion (DJF) running very close to long term averages. Most of us, though, recognize that a *real* winter in these parts is more like NDJFMA.

The real kicker was our apparent lack of **springtime**, the fact that March, April, through mid May of 2013, ran 10 degrees below normal in temperatures, which made the past winter season seem so awful. That coupled with much above normal late season snows and/or early spring rains raised the prospects for significant spring snowmelt flooding. The fact that 2012 was a record warm and abnormally dry year helped to mitigate the overall flooding threat, especially across the central and southern basin, but made our cold late winter and springtime seem just so much more miserable. The late spring snowmelt and lingering cold/wet soil conditions did make for delayed and difficult spring planting conditions, especially across northern portions of the basin. Oddly enough, for most of us, the last frost (32F) and last hard freeze (28F) both occurred on May 12<sup>th</sup>. This was almost a week *earlier* than average for the former (May 18<sup>th</sup>) and only about a week later than average for the later (May 4<sup>th</sup>).

Yet our **summer** clearly showcased our region's marked climatic variability, as both precipitation and temperatures jumped above average, but with wild fluctuations from month to month and county to county. Portions of the southern Red River Basin (Fargo area) and much of western and south-central ND received as much as 10 inches above normal summertime rain, with localized flash flooding episodes, while northeastern portions of ND and the northern Red River Basin (Grand Forks area) through northern MN ran closer to normal. Though the turn from mid-July into mid-August ran a bit cooler than normal, the months of June and September more than made up the difference so that the summer season ended up just a tad warmer than average. In fact, our **cooling degree days** for 2013 (a measure of how hard your air conditioner has to work) ended up well above average across the area (528 CDDs in Grand Forks and 699 in Fargo), which is a tad lower than 2012 (607 and 795, respectively) but well ahead of our longer term average (463 and 507, respectively). Much like 2012, our summertime severe storm and tornado load was roughly half of our long term averages. In 2012 this was largely due to widespread dry conditions (lack of moisture) while in 2013 it was more due to the overall cooler mid-July and early August conditions, coupled with short term drought.

Early **autumn** continued with somewhat warmer than average conditions, which helped to extend the spring-shortened growing season well into the fall, for those areas that managed to get crops planted. Most areas didn't even see a frost or hard freeze until mid to late October, versus our more typical late September frosty periods. So the actual growing season, as measured by **frost free days**, ran from May 12 through October 15, and about a month longer (155 days in GF, 156 in Fargo) than our long term normal (125 days). But fall is typically a short lived gambit in any year, and this year, the autumn season was cut short with a rapid descent into almost continuously sub-freezing temperatures for the later half of November and a somewhat early continuous snowcover beginning by November 21<sup>st</sup> in the north basin, by November 30<sup>th</sup> in the south basin.

December 2013 has already established a wicked cold trend which could flavor the rest of this **winter** (2013/2014), running at 10 or more degrees below long term averages across most all of North Dakota and northern Minnesota, a trend which is looking to continue well into January of 2014.

**Winter is the reason.** So yes, the grasp of winter was not just longer than normal but stronger too, throughout the whole of Calendar Year 2013, with deep cold linger into spring and turning again bitter cold in late fall. If you look at **Heating Degree Days** (how hard your furnace had to work), for the Calendar Year 2013 just ended, we amassed some 700-900 more HDDs (10152 in GF, 9578 in Fargo), which would place us at about 15<sup>th</sup> to 20<sup>th</sup> overall in the 100+ years of recorded history of such things.

### **A Few Monthly Details:**

**January.** Overall temperatures ran near to slightly above for the area, with precipitation near to above normal as well. Winter storm to Blizzard conditions occurred twice this month, on the 11<sup>th</sup> and 19<sup>th</sup>, with heavy snows occurring on the 28<sup>th</sup> as well. Extreme Cold conditions followed on the heels of the January 19<sup>th</sup> blizzard and persisted into the 22<sup>nd</sup>.

**February.** Heavy Snow and/or Blizzard conditions were met on both the 10<sup>th</sup> and 18<sup>th</sup> of February across much of the area. A pattern began to emerge with heaviest snowfalls most often occurring from far southeastern ND into north central and central MN, or right along the CanAm border. Overall, temperatures tipped slightly below normal, while precipitation ranged slightly above normal.

**March.** Additional heavy Snow episodes occurred on March 4<sup>th</sup>, 8<sup>th</sup>, and 17<sup>th</sup>, with strong wind creating widespread Blizzard conditions of the 18<sup>th</sup>. Snow and Ice were especially heavy across the southeast ND into north-central MN sector, and snow water content along the Canadian border and across the far southern Red River Basin began to look especially worrisome. Temperatures across the area averaged 10 or more degrees below normal, with no thaw in sight.

**April - May.** Our last Winter Storms and Blizzard of the season occurred from April 11<sup>th</sup> through the 15<sup>th</sup>, adding appreciably to the existing winter snowpack. Total snowfall amounts at Fargo pushed to over 68 inches (18 inches above normal) and to nearly 90 inches from Park Rapids into Bemidji. The 2013 spring snowmelt flood cycle began about a week later than average, with river flood crests occurring from late April through the end of May. Of the 34 river forecast points which are forecast by the NWS, there were twelve tributary locations mainly across the central portions of the Red River Basin (including the upper Sheyenne, Red Lake, and Roseau Rivers) which did not reach flood stage. Of the remaining 22 locations, 17 sites across the far southern basin, all along the mainstem Red River, and across the far north basin, reached moderate to major flood stage. It appears that the miserably cold and long drawn out thaw process did act to allow soils in the southern basin to thaw and absorb moisture more readily than expected, and thus greatly reduced the overall flood threat there. Meanwhile, Grafton came within a half a foot of reaching its Flood-or-Record twice during the month of May.

A transition to summer thunderstorms, with damaging winds and large hail, began around mid May. The first tornadoes of the season were about two week later and developed very near to Grafton ND, while spring snowmelt flood waters were still running high, on May 31<sup>st</sup>.

**June.** June was especially stormy on the 19<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, and 26<sup>th</sup>. Weak tornadoes occurred in Barnes, Clay, and Wilkin Counties on these days. Especially damaging winds occurred across Barnes, Cass, Clay,

Becker, Ottertail, and Grant Counties on the 20<sup>th</sup>; across central Kittson County on the 25<sup>th</sup>; and across Norman and Mahnomen Counties on the 26<sup>th</sup>. Widespread heavy rains led to flash flooding near Valley City ND and Perham MN on the 20<sup>th</sup>, while Casselton ND, Fargo ND, Christine ND, and Wolverton MN all contended with especially heavy rains and flash flooding on the 25<sup>th</sup>. Rain gages between Christine ND and Wolverton MN recorded from 8 to 10 inches of rainfall, interspersed with episodes of golfball to baseball sized hail. Overall, temperatures averaged a degree or 2 above average, while precipitation ranged from slightly below average in the north basin to well above average in the south.

**July.** The month started warmer and drier than normal, but with only a weak funnel or two being reported through the first half of the month. Damaging downburst wind episodes raked across Ramsey County ND on the 9<sup>th</sup>, and Pennington County MN on the 12<sup>th</sup>. The summer's most dramatic severe weather outbreak occurred from the evening of the 21<sup>st</sup> (in eastern North Dakota) into the early morning of the 22<sup>nd</sup> (in northwest Minnesota), with F1 and F2 rated tornadoes tracking for a total of 29 miles, across areas south of Starkweather ND, north of Trail MN, and east of Mahnomen MN. Though several structures and forested areas were heavily damaged east of Mahnomen and near Roy Lake MN, no injuries were reported by any of these events. Otherwise dry conditions kept the overall footprint of such wind, rain, and hail storms quite small. Temperatures for the month turned a bit cooler, so that the average temperature came in near normal with precipitation generally below normal.

**August.** Severe thunderstorms with damaging winds and two embedded tornadoes made a race across Barnes, Ransom, and Richland Counties on August 6<sup>th</sup>, dumping damaging winds and large hail into the Wahpeton ND and Breckenridge MN metro area. Conditions were markedly cooler and quite from then until the 18<sup>th</sup>. Episodic storms with large hail and damaging winds occurred around the area on the 18<sup>th</sup>, 24<sup>th</sup>, 25<sup>th</sup>, 29<sup>th</sup>, and 31<sup>st</sup>. On the 31<sup>st</sup>, a brief tornadic thunderstorm which developed in Pembina County ND later developed into a line of damaging downburst wind events across far eastern ND and northwest MN. The month ended up running near to slightly above normal in temperatures, but well below normal for precipitation.

**September.** The month was warmer than normal by about 4 to 5 degrees, but drier than normal by about an inch. Isolated severe hail and wind storms occurred on the 9<sup>th</sup>, 11<sup>th</sup>, and 18<sup>th</sup>, with a singular tornadic thunderstorm passing between Williams and Baudette MN, in Lake of the Woods County.

**October.** October was almost storm free, with only one potentially tornadic day on the 11<sup>th</sup>, with a total of three brief funnels, and no touchdowns, no large hail, and no damaging wind being reported. Temperatures were near seasonal normals in the north and just a degree or so cooler than normal in the south. Precipitation ranged roughly 2 inches shy of normal across the area.

**November.** With no strong to severe storms occurring, the month ended with temperatures just a tad cooler than normal and precipitation running near to below normal. An inch or three of snowfall managed to accumulate across the north basin from the 20<sup>th</sup> through the 22<sup>nd</sup>, and the ground stayed white from then on. The south basin received scant snowfall through the 31<sup>st</sup>.

**December.** The month was bracketed with a widespread heavy snow episode on the 3<sup>rd</sup> and 4<sup>th</sup>, and a Blizzard on 28<sup>th</sup>. In between, a string of wind chill advisories and warnings demonstrated how the temperatures had plummeted and winter had come on strong. Overall, temperatures ended up a good 10 to 12 degrees cooler than long term averages while precipitation jumped just a bit higher than normal.

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***So why is it that we have such a great degree of volatility and variability in our weather, again?***

**Think Extreme Continentality!** Because we in the Red River Basin (and our Northern Plains in general) live smack dab in the middle of the North American Continent, farthest from the modifying effects of the world's oceans, equidistant from both the Equator and the North Pole, we happen to have the greatest degree of variability in daily, weekly, seasonal, and annual measures of both temperature and precipitation, as we are alternately affected by both tropical and arctic air masses.